Amendments to the Drawings:

The attached sheets of drawings include changes to FIG. 1, FIG. 2a and FIG. 3. These sheets, which include FIG. 1, FIG. 2a, FIG. 2b and FIG. 3, replace the original sheets including the same figures.

Attachment: 3 Replacement Sheets

      3 Annotated Sheet Showing Changes

REMARKS/ARGUMENTS

The Examiner has required the inclusion of a legend such as "Prior Art" in Figure 1. Figure 1 is amended accordingly and a revised replacement sheet as well as a red-lined copy are enclosed. Additionally, Figures 2a and 3 are also amended to include the caption "Prior Art."

The Examiner has rejected pending Claims 1 - 6 under 35 U.S.C. §112, first and second paragraphs, for lack of enablement and indefiniteness. Claim 6 is being canceled and Claims 1 - 5 are being amended. New Claims 7 - 14 are being added. Claims 1 - 5 and 7 - 14 are now pending of which claims 1, 4 and 7 are independent. The Applicant submits that the now pending claims are enabled and definite in view of both the known prior art and the text and drawings of the present Application, such that ones skilled in the art can practice the invention without undue experimentation.

Amended Claim 1 now calls for (underlining added for emphasis): ... arranging, in time sequence, a plurality of subfields each having a brightness weight, and achieving gray-scale representation by a combination of one or more of the plurality of subfields, the gray-scale representation including a plurality of gray scales of increasing value, every two adjacent gray scales including a higher gray scale of a first value and a lower gray scale of a second value, the second value being higher than the first value, each subfield of the plurality of subfields including an address period and a sustain period, an address pulse capable of generating light being provided during the address period and sustain pulses capable of generating light being provided during the sustain period; and ... determining the number of sustain pulses for each subfield so that a difference between a light generated from the sustain pulses of the subfields combining to form the higher gray scale and a light generated from sustain pulses of the subfields combining to form the lower gray scale is greater than a light generated during one address period when a number of subfields of the higher gray scale of the two adjacent gray scales is less than a number of subfields of the lower gray scale of the two adjacent gray scales.

Amended Claim 2 now calls for (underlining added for emphasis): ... wherein the number of sustain pulses of a subfield having a brightness weight of 1 is determined as zero so

that a light for <u>a minimum gray scale</u> including the subfield having a brightness weight of 1 <u>corresponds to the light discharged in the address period</u>.

Amended Claim 3 now calls for (underlining added for emphasis): ... wherein the <u>number of sustain pulses for each subfield is determined</u> so as to make the <u>number of sustain pulses of</u> the subfields combining to form <u>the higher gray-scale</u> of the two adjacent gray scales <u>equal to</u> the number of sustain pulses of the subfields combining to form <u>the lower gray-scale</u> <u>when</u> the <u>number of subfields</u> for the <u>higher gray-scale</u> is <u>greater</u> than the number of subfields combining to form the <u>lower gray-scale</u>.

Amended Claim 4 now calls for (underlining added for emphasis): ... <u>arranging, in time sequence, a plurality of subfields</u> each having a brightness weight, and <u>achieving gray-scale representation</u> by a combination of the one or more of the plurality of subfields, each subfield of the plurality of subfields including an address period and a sustain period, an address pulse generating light being provided during the address period and sustain pulses generating light being provided during the sustain period, the gray-scale representation including gray scales ordered from a minimum gray scale value to a maximum gray scale value, a light corresponding to each gray scale including a light discharged during all of the address periods and all of the sustain periods of the subfields combined together to represent the gray scale, between every two adjacent gray scales, one gray scale of the two adjacent gray scales being a lower gray scale corresponding to a lower light and the other gray scale of the two adjacent gray scales being a higher gray scale corresponding to a higher light; and ... <u>determining the number of sustain pulses for each subfield</u> so that a light corresponding to the higher gray scale of two adjacent gray scales is greater than a light for the lower gray scale, and ... wherein the <u>number of sustain pulses for each subfield is determined to make the number of sustain pulses for the higher gray scale</u> of the two adjacent gray scales <u>equal to</u> the number of sustain pulses for <u>the lower gray scale</u> <u>when</u> the <u>number of subfields for the higher gray scale</u> is <u>greater than</u> the number of subfields for <u>the lower gray scale</u>.

Amended Claim 5 now calls for (underlining added for emphasis): ... wherein a <u>number of sustain pulses</u> corresponding to a subfield having a <u>brightness weight of 1</u> is determined as

zero so that a light for a minimum gray scale comprised of the subfield having the brightness weight of 1 is the light discharged in the address period.

The Applicants submit that amended Claims 1 - 5 are enabled and definite under 35 U.S.C. §112, first and second paragraphs, for lack of enablement and indefiniteness

Regarding the enablement rejection, of the factors enumerated in the Office action, the state of the prior art and the level of predictability in the art is set forth by the references mentioned in the Office action. (Office action, p. 5, last 4 lines.)

Of the references cited by the Examiner for establishing the state of prior art and the level of predictability in the art, Yamada (U.S. Patent No. 6,323,880) discloses that the light intensity of a subfield may be changed. (Yamada, Abstract.) Shinoda (U.S. Patent No. 5,541,618) discloses that the number of sustain pluses included in each display period may be predetermined differently for each subframe according to the weight given the subframe. (Shinoda, Abstract.) Of the same group of references, Awamato (U.S. Patent No. 5,898,414) includes a figure 14 that shows subframes being arranged in an arbitrary order. (Awamato, col. 12, lines 1 - 15.) The order of subframes are changed according to an external control signal. (Id.) As such, changing the number of sustain pulses in a subfield to change the light generated during that subfield and changing the order of the subfields are know in the art.

In view of these references and the specification and the drawings of the current Application, the Applicant submits that the currently pending claims of the Application are enabled.

Independent Claim 1, for example, is directed to "arranging ... a plurality of subfields," "achieving gray-scale representation by a combination of one or more of the plurality of subfields," and "determining the number of sustain pulses for each subfield," all of which are within the capabilities and knowledge of a person of ordinary skill in the art.

Embodiments of the invention set forth specific schemes of determining the number of sustain pulses of the subfields in order to achieve correct gray scale representation from the combination of the subfields.

Background section of the Application describes figure 2a. Figure 2a shows an arrangement of twelve subfields from subfield 1 to subfield 12. The subfield weight corresponding to each subfield is shown in the first 12 columns of the top row. The last column of the top row includes the number 255 which is a sum of the subfield weights of all of the twelve subfields and corresponds to the maximum gray scale of 255 that may be obtained from combining all of the twelve subfields. The bottom row of figure 2a includes the number of sustain pulses corresponding to each subfield and to each subfield weight. The last column of the bottom row includes the number of sustain pulses that correspond to the maximum gray scale of 255. Figure 2b includes three columns, establishing a correspondence between the gray scale, the subfield structure or the subfields that are combined to obtain the corresponding gray scale and the light structure resulting from the combination of these subfields. The light structure shows how many address pulses (A) and how many sustain pulses (+number) result from each combination of subfields and correspond to each gray scale. Only the first 11 gray scales, from gray scale of 0 to gray scale of 10 are shown in the table of figure 2b to provide an example of how the subfields are combined to obtain each gray scale.

Background of the Application also explains that in conventional designs, the address light generated from the address pulse was negligible compared to the sustain light from the sustain pulses. Therefore, the conventional gray-scale representation depended only on the number of sustain pulses. (Specification, p. 4, lines 12 - 13.) The Background, then sets forth the problems that arise when the address light is equal to or greater than the unit sustain light. (Specification, p. 5, lines 7 - 10.)

Summary of the Invention, sets forth specific schemes of determining the number of sustain pulses of the subfields in order to achieve correct gray scale representation even when the address light is significant and can interfere with gray scale representation.

Specific working examples of the schemes presented by the embodiments of the invention are provided in figures 4a and 4b.

Figure 4a shows an arrangement of twelve subfields from subfield 1 to subfield 12. This figures is similar to the prior art figure of 2a except that the number of sustain pulses

corresponding to the third subfield is reduced from 3 to 0 and the number of sustain pulses for other subfields are reduced by two. The number of sustain pulses for generating the maximum gray scale of 255 is reduced from 511 to 509. The reduction in the number of pulses required to represent a subfield weight and achieve the gray scale representation provides a saving in power consumption. (Specification, p. 11, lines 1 - 3, p. 12, lines 7 - 9.)

Figure 4b shows the correspondence between the first 11 gray scales, the combination of the subfields (subfield structure) that achieves each gray scale, and the number of address (A) and sustain pulses that correspond to each combination of subfields. The entries in the light structure column are obtained from the subfield structure column and from the number of sustain pulses shown for each subfield weight in figure 4a. For example, gray scale of 3 is obtained by combining the second subfield (2SF) and the third subfield (3SF). Each subfield has one address period and therefore a combination of two subfields results in 2 address pulses (2A). Figure 4a shows that the second subfield has 3 sustain pulses and the third subfield has zero sustain pulses. So, the light structure for gray scale 3 is 2A+3+0=2A+3.

One of the schemes presented by the embodiments of the invention is exemplified by gray scales of 6 and 7 in figure 4b. Gray scale 6 corresponds to a light structure so 3A+8 and gray scale 7 corresponds to a light structure of 2A+11. If each address pulse A generates a light that is equal to one sustain pulse, gray scale 6 would correspond to 3+8=11 sustain pulses and gray scale 7 would correspond to 2+11=13 sustain pulses. The light generated for gray scale 7 is higher than the light of gray scale 6 as it should be. If the light of each address pulse is twice the light of a sustain pulse, the order of the gray scales 6 and 7 remains undisturbed. However, if the address pulse is as bright as 3 sustain pulses, then the light generated for both gray scales 6 and 7 would be equal corresponding to 17 sustain pulses. This disturbs the gray scale order. The scheme of the invention, determines the number of sustain pulses of each subfield taking into account the brightness of the address pulse. (Specification, p. 11, lines 9 - 21.)

Another one of the schemes presented by the embodiments of the invention is exemplified by gray scale pairs of 2, 3 and 5, 6 and 8, 9 in figure 4b. As can be seen between the gray scale pair of 2, 3, the number of subfields combined to form the higher gray scale 3 is larger

than the number of subfields forming the lower gray scale 2. In this case, the number of sustain pulses for the two gray scales is kept equal in order not to cause a jump in brightness from one gray scale to the next. The correct gradation from the lower gray scale to the higher gray scale is obtained from the increase in the number of subfields and the associated increase in the number of address pulses. (Specification, p. 11, line 22 to p. 12, line 3.)

As such, Applicant submits that amended Claims 1 - 5 are enabled and working examples are set forth in the Application.

Further, support for the new claims 7 - 14 may be found throughout the specification and drawings. Some exemplary passages are included below for the convenience of the Examiner. Support for each claim is not limited to the exemplary passages cited below and for the sake of brevity, not all of the supporting passages are cited for each claim.

Support for Claim 7 may be found, for example, in figure 4b and on page 9, lines 5 - 10.

Support for Claim 8 may be found, for example, in figure 4b and on page 11, lines 9 - 21. Figure 4b, for examples, shows that with gray scales of 6 and 7 where three subfields are used to generate the gray scale of 6 and only two subfields are used to generate the higher gray scale of 7, to compensate for the reduction in the number of subfields and their corresponding address lights, the number of sustain discharges is increased from the lower gray scale of 6 to the higher gray scale of 7.

Support for Claim 9 may be found, for example, in figure 4b and on page 11, line 22 to page 12 line 3. Figure 4b, for examples, shows that between the gray-scale pair of 2, 3, the gray-scale pair of 5, 6, and the gray-scale pair of 8, 9, the number of subfields being used in the subfield structure is increased from the lower gray scale to the higher gray scale, while the number of sustain pulses is kept constant in the light structure column.

Support for Claim 10 may be found, for example, in figure 4b and on page 8, lines 9 - 11. Figure 4b, for examples, shows that between the gray-scale pair of 1, 2, the gray-scale group of 3, 4, 5, the gray scale pair of 7,8 and the gray-scale pair of 9, 10, the number of subfields being used in the subfield structure remains the same from the lower gray scale to the higher gray scale, while the number of sustain pulses is increased in the light structure column.

Support for Claim 11 may be found, for example, on page 9, lines 11 -12 and on page 10, lines 15 - 17.

Support for Claims 12, 13 and 14 may be found, for example, in figures 4a and 4b and on page 11, lines 7 - 8.

Therefore, in view of the above amendment and remarks it is submitted that the now pending claims are enabled and definite. As such, allowance of the above Application is requested.

Respectfully submitted,

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FS/cah

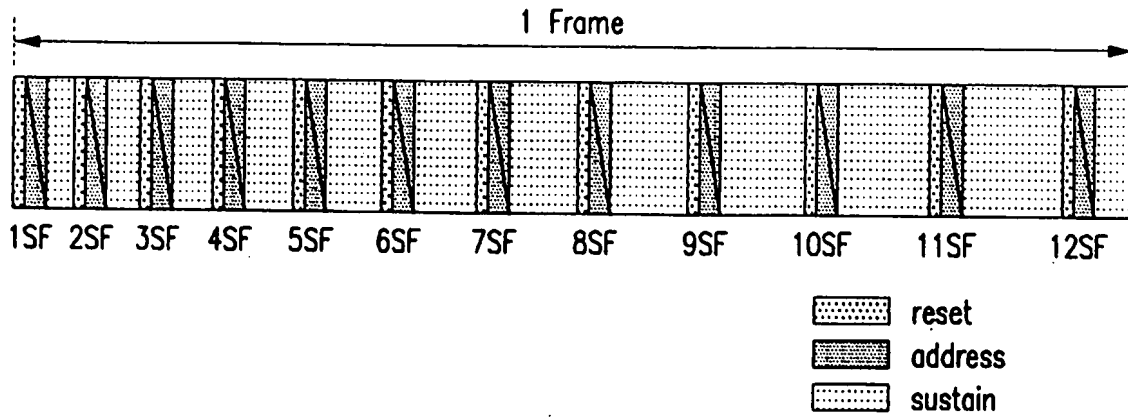CAH PAS726138.4-*-05/7/07 3:09 PM
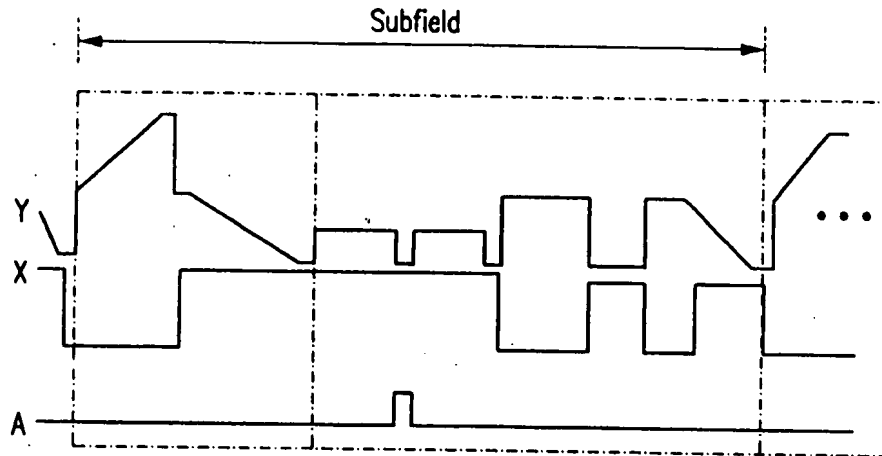
APPENDIX

FIG.1 (PRIOR ART)

1 Frame

1SF 2SF 3SF 4SF 5SF 6SF 7SF 8SF 9SF 10SF 11SF 12SF

reset
address
sustain

FIG.2a (PRIOR ART)

SF weight	3	2	1	6	8	10	13	21	32	43	53	63	255
The number of sustain pulses	7	5	3	13	17	21	27	43	65	87	107	127	511

FIG.2b

Gray scale	Subfield structure	Light structure
0	–	–
1	3SF	A+3
2	2SF	A+5
3	2,3SF	2A+8
4	1,3SF	2A+10
5	1,2SF	2A+12
6	1,2,3SF	3A+15
7	3,4SF	2A+16
8	2,4SF	2A+18
9	2,3,4SF	3A+21
10	1,3,4SF	3A+23

FIG.3 (PRIOR ART)

Subfield

Y

X

A

Light = Reset light + Address light + Sustain light